We claim:

1. A method for conditioning a periodic analog signal to have positive and negative desired peak values, comprising:

detecting a peak value of the periodic analog signal;

sequentially performing signal correcting steps, each signal correcting step comprising a multiplicative correcting step which modifies the amplitude of the periodic analog signal, and an additive correcting step which adds to the periodic analog signal a constant so as to change the offset of the periodic analog signal in a positive or negative direction, the sequence of signal correcting steps being performed in a portion of a period of the periodic analog signal and reducing a difference between the detected peak value and a desired peak value in a stepwise manner.

2. The method as claimed in Claim 1 wherein a signal correcting step comprises:

a multiplicative correcting step to amplify the periodic analog signal in a positive direction and an additive correcting step to provide a signal offset to the periodic analog signal in a negative direction if the detected peak value is greater than the desired peak value within a positive part of a period of the periodic analog signal;

a multiplicative correcting step to amplify the periodic analog signal in a negative direction and an additive correcting step to provide a signal offset to the periodic analog signal in a positive direction if the detected peak value is less than the desired peak value within a positive part of a period of the periodic analog signal;

a multiplicative correcting step to amplify the periodic analog signal in a negative direction and an additive correcting step to provide a signal offset to the periodic analog signal in a positive direction if the detected peak value is greater than the desired peak value within a negative part of a period of the periodic analog signal; and

a multiplicative correcting step to amplify the periodic analog signal in a positive direction and an additive correcting step to provide a signal offset to the periodic analog signal in a negative direction if the detected peak value is less than the desired peak value within a negative part of a period of the periodic analog signal.

3. The method as claimed in Claim 1, further comprising the step of:

following the step of detecting and prior to performing the signal correcting steps, selectively performing a plurality of adjusting steps to adjust a reference signal in a stepwise manner from the desired peak value to approximately the detected peak value, the number of adjusting steps equaling the number of signal correcting steps, the periodic analog signal being modified in a signal correcting step substantially the same as the reference signal is adjusted in a corresponding adjusting step.

4. The method as claimed in Claim 1, wherein the sequence of signal correcting steps are carried out at a frequency which is greater than the bandwidth of the periodic analog signal.

5. The method as claimed in Claim 1, further comprising the step of temporarily storing the detected peak value of the periodic analog signal.

6. The method as claimed in Claim 1, further comprising:

detecting a zero crossing of a second periodic analog signal that is approximately 90 degrees out of phase relative to the periodic analog signal, the signal correcting steps are performed following the detection of a zero crossing of the second periodic analog signal.

7. The method as claimed in Claim 6, wherein the periodic analog signal and the second periodic analog signal are sinusoidal signals such that the zero crossing of the second periodic analog signal substantially occurs when the periodic analog signal is at a peak value.

8. The method as claimed in Claim 1, wherein the multiplicative correcting step and the additive correcting step of a signal correcting step occur at substantially the same time.

9. A device for conditioning at least one periodic analog signal, comprising:

an adjusting circuit to which a first periodic analog signal is supplied and which selectively amplifies the first periodic analog signal and selectively provides a signal offset thereto; and

a compare circuit coupled to an output of the adjusting circuit for comparing a peak value of the first periodic analog signal to an adjustable reference signal, the compare circuit generating control signals that are based upon the comparison for controlling the adjusting circuit so that the first periodic analog signal is adjusted by the adjusting circuit in each of a plurality of steps, the plurality of steps occurring within a portion of a period of the periodic analog signal.

10. The device of claim 9, further comprising:

a peak value detector connected between the adjusting circuit and the compare circuit, the peak value detector maintaining a peak value of the output of the adjusting circuit until the peak value detector is reset.

11. The device of claim 9, wherein the compare circuit comprises:

an adjustable reference source for generating the adjustable reference signal, the adjustable reference signal being an analog signal, the compare circuit adjusting the adjustable reference signal in sequential stepped levels between a predetermined value corresponding to a desired peak value and a peak value of the first periodic analog signal.

12. The device of claim 11, wherein the compare circuit comprises:

one or more storage elements for maintaining one or more values corresponding to a number of stepped levels utilized in adjusting the reference signal.

13. The device of claim 12, wherein:

the one or more storage elements maintain one or more values corresponding to a direction of the sequential stepped levels utilized in adjusting the reference signal.

14. The device of claim 13, wherein the adjusting circuit adjusts the amplitude and offset of the first periodic analog signal in a stepped manner based upon the values maintained in the one or more storage elements.

15. The device of claim 9, further comprising:

a second adjusting circuit to which a second periodic analog signal is supplied and which selectively amplifies the second periodic analog signal and selectively provides a signal offset thereto; and

a second compare circuit coupled to an output of the second adjusting circuit for comparing a peak value of the second periodic analog signal to a second adjustable reference signal, the compare circuit generating control signals that are based upon the comparison for controlling the second adjusting circuit so that the second periodic analog signal is adjusted by the second adjusting circuit in each of a plurality of steps, the plurality of steps occurring within a portion of the second periodic analog signal.

16. The device of claim 15, further comprising:

a zero detection circuit for receiving the first and second periodic analog signals, wherein the first and second periodic analog signals are approximately 90 degrees out of phase with each other, the adjusting circuit and the compare circuit condition the first periodic analog signal upon the zero detection circuit detecting the second periodic analog signal crossing a zero reference, and the second adjusting circuit and the second compare circuit condition the second periodic analog signal upon the zero detection circuit detecting the first periodic analog signal crossing the zero reference.

17. The device of claim 15, further comprising:

a third adjusting circuit to which a third periodic analog signal is supplied and which selectively amplifies the third periodic analog signal and selectively provides a signal offset thereto;

a third compare circuit coupled to an output of the third adjusting circuit for comparing a peak value of the third periodic analog signal to a third adjustable reference signal, the compare circuit generating control signals that are based upon the comparison for controlling the third adjusting circuit so that the third periodic analog signal is adjusted by the third adjusting circuit in a stepwise manner.

18. The device of claim 17, further comprising:

a level comparator circuit for comparing the first and second periodic analog signals and indicating when the first and second periodic analog signals are substantially the same, the third adjusting circuit and the third compare circuit being initiated to adjust the third periodic analog signal by the level comparator.

19. The device of claim 15, further comprising:

phase correcting circuitry for adjusting a phase difference between the periodic analog signal and the second periodic analog signal, comprising circuitry for generating an auxiliary signal based upon the periodic analog signal and the second periodic analog signal and for incrementally displacing the phase between the periodic analog signal and the second periodic analog signal based upon the auxiliary signal.

20. A method of conditioning on a periodic analog signal, comprising:

performing a sequence of error detection operations on a reference signal in a stepwise manner during a portion of a period of the periodic analog signal so that the reference signal is adjusted from a predetermined level to a peak level of the periodic analog signal; and

performing a sequence of error correction operations on the periodic analog signal in a stepwise manner during a portion of a period of the periodic analog signal so that the periodic analog signal is within a predetermined range of levels, each error correction operation comprising:

amplifying the periodic analog signal; and

providing a signal offset to the periodic analog signal during the time the periodic analog signal is being amplified, the number of error correction operations equaling the number of error detection operations, and each error detection operation adjusting the reference signal in a similar manner that the corresponding error correction operation adjusts the periodic analog signal.